day 15

2.6/57 $5000 is invested for 10 yrs

annual interest of r, compounded monthly

After 10 yrs, $A(r) = 5000\left(1+\frac{r}{12}\right)^{120}$

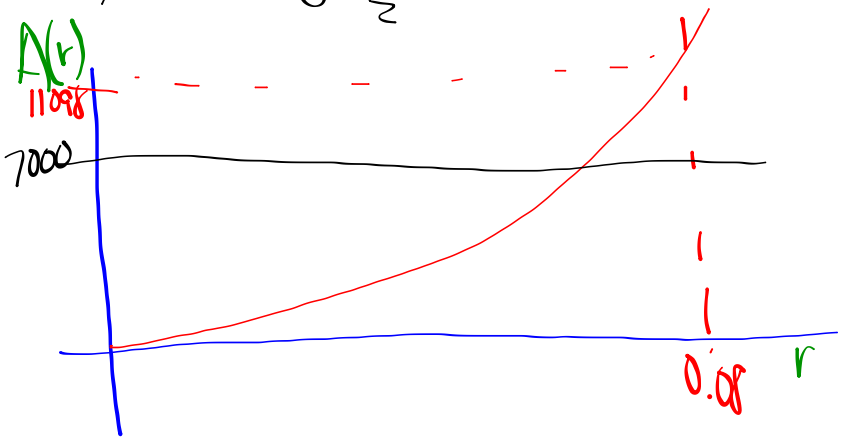
a) $r \in (0, 0.08) \Rightarrow A(r) \overset{\$}{=} 7000$

since A(t) is continous on [0, 0.08] AND $0 < 7000 < 11098.2$ IVT which works

$r = 0 \Rightarrow A(r) = 5000$

$r = 0.08 \Rightarrow A(r) = 11098.20$

b) Use a graph



day 15

2.6 #59 $2x^3+x-2=0$ $(-1,1)$

consider $y=2x^3+x-2$

y is a polynomial and so is continuous

$y(-1)=-5$ $y(+1)=1$

$0 \in (-5,1)$ (IVT)

so $\exists\, c \in (-1,1)$ where $y(c)=0$ (IVT)

"there exists" → lower case c

Sep 18-7:18 AM

day 15

26/60 $\sqrt{x^4+25x^3+10} = 5 \quad (0,1)$

0) verify continuity given

1) plug in 0

2) plug in 1

$y=\sqrt{x^4+25x^3+10}$

get y

get y

3) Is 5 between?

if YES, IVT Theorem applies

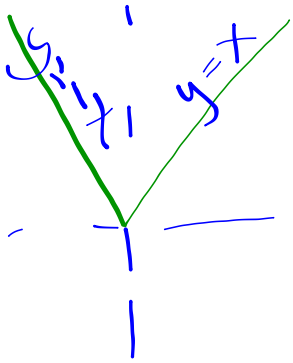
Sep 18-7:18 AM

day 15

2.6/66 $|x|$ is continuous for all $x$.

Gotta know

$$|x| = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$




a) on $(0,\infty)$, $y=x$ is a polynomial and $\therefore$ continuous

$\therefore$ = therefore

b) on $(-\infty,0)$, $y=-x$ is a p-n and $\therefore$ continuous

c) what about 0?

$\lim_{x\to 0^-} |x| = \lim_{x\to 0^-}(-x) = 0$

$\lim_{x\to 0^+} |x| = \lim_{x\to 0^+}(x) = 0$

So $\lim_{x\to 0} |x| = 0$

$|x|$ is defined at $x=0$

$\lim_{x\to 0} |x|$ exists

$|0| = \lim_{x\to 0} |x|$

$\therefore$ continuous at $x=0$

day 15

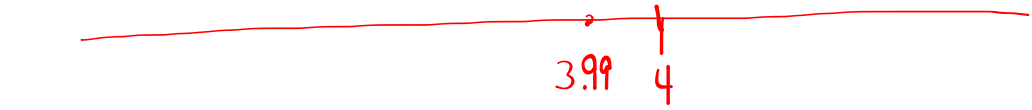
2.6/67) $y = |x^2 + 3x - 18|$

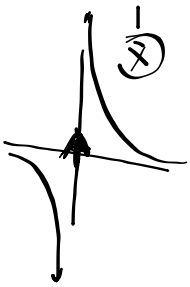
Mathematicians are just the RIGHT amount of lazy.

1) I know polynomials are cont. everywhere
2) I know $|x|$ is cont. everywhere
3) I know a cont. fn composed with a cont. fn. is continuous

Sep 18-7:18 AM

day 15



Sep 18-7:18 AM